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ABSTRACT

A study examined the effect of gender, age, and cognitive task on three types of reading recall. Subjects, 40 boys and girls in the second grade and 40 in the fifth grade from a suburban Northeast school system, all reading at or above grade level, performed cued or free recall on four high-interest short stories. Reading recall was assessed via the number of explicit idea units (explicit text details), implicit idea units (inferences), and figurative idea units (metaphors and/or analogies) recalled. Results showed significant main effects for age and task, as expected, with clear differences favoring fifth graders over second graders and favoring subjects in the cued condition over the free. No main effect was found due to gender differences; however, sharp differences between boys and girls were found depending upon the information retrieval task they were assigned. Boys' and girls' reading recall performances differed dramatically, with boys demonstrating superior recall in the cued condition and girls in the free condition. Findings suggest that boys need more structure in their recall tasks, while girls are better at imposing their own structure. The study illustrates the importance of continued attention to gender as it interacts with reading recall in complex ways. A follow-up study combining quantitative and qualitative research methods will address the issue of why the present results might have occurred. (Four figures and four tables of data are included; 18 references are attached.) (SR)

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Children's Reading Task by Gender Interactions: Implications for Research and Practice

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Children's Reading Task by Gender Interactions: Implications for Research and Practice

A. OBJECTIVES

This study examined the effect of Gender, Age and Task on three types of Reading Recall. More specifically, differences in reading recall were studied in boys and girls in the second and fifth grades with either a cued or free recall task in a 2 X 2 X 2 full factorial design.

B. THEORETICAL FRAMEWORK

Psychologists have long held the belief that boys and girls evidence different strengths and patterns in their development of verbal skills. This belief was reiterated and strengthened by Maccoby and Jacklin's (1974) seminal review of 85 studies. However, over the intervening years, research methods have become more sophisticated and knowledge of the development of cognitive processes and their influence on the reading process have expanded. Using one of the new statistical tools, meta-analysis, Hyde and Linn (1988) reexamined Maccoby and Jacklin's pre-1973 findings and analyzed additional gender studies in verbal ability since 1973. They concluded that any difference that may have existed prior to 1973 has decreased to the point "... that it can effectively be considered to be zero."(p. 33)

In addition to methodological advances in research design, our understanding of the cognitive complexity of the reading act

has been more clearly defined. The current cognitive perspective (Anderson, 1985; Bransford, 1985) views reading comprehension as an interactive process whereby the reader brings to the text all existing background knowledge (schema) and processing strategies. The reader then constructs meaning through an interaction of existing cognitive schema, text characteristics, task demands and general contextual effects (Taylor, Harris, Pearson, 1988). Most of the pre-1973 studies and many of the post-1973 studies, would not have had the advantage of viewing reading comprehension from the more recently illuminated perspective afforded today's researcher.

Even though Hyde and Linn (1988) did not find significant gender differences in the studies they reviewed, they stressed a need for further research in the area, particularly for studies using a more sophisticated analysis of verbal abilities than the one traditionally associated with general intellectual ability. Davey (1989) has also pointed out the problems associated with the traditional assessment of reading comprehension. More recent emphasis on uncovering the cognitive strategies used by readers and on identifying the complex interactions among text, task and reader and how these interactions affect comprehension and learning are refining and clarifying our understanding of the reading process. The authors of this study suggest that viewing reading recall from the perspective of schema theory and task analysis provides just such an approach.

C. METHODS AND PROCEDURES

Materials

Since the present study's purpose was to investigate the relationship of cognitive task differences, age and gender, it was important to control for reader interest which has been found to relate to gender in previous research. The stories were selected to be of equal interest to both genders and to be within the subjects' reading ability levels.

The materials used in the study included: (a) four high interest short stories; (b) four sets of 12 test questions, one set for each of the four stories; (c) interview guides for each of the two experimental conditions (cued and free recall); and (d) a scoring guide for both free and cued recall protocols.

Interrater reliability Interrater reliabilities were obtained both for the analysis of the protocols into propositions (idea units) and for the classification of the propositions as to type. The two scorers achieved interrater reliabilities of .99 for all categories.

Test-retest reliability Coefficients of .91 for cued recall and .77 for free recall were obtained on pilot data with a one week interval between testing.

Procedures

The four stories were individually presented to the subjects. The experimenter read all directions aloud and each subject was asked to read each passage silently. No time restrictions were imposed as suggested by Dwyer (1979) when

investigating gender differences in cognitive functioning. Any unknown words indicated by each subject were pronounced by the experimenter. Upon completion of the reading of each passage, the text was returned to the experimenter and the recall task was initiated.

D. DATA SOURCE

Forty subjects at both second and fifth grade levels (N = 80), stratified randomly by school, were selected from a suburban school system in the Northeast. All subjects selected were reading at or above grade level as measured by a school administered reading test and were within the normal age range for their grade placement, 7.5 to 8.5 for second grade and 10.2 to 11.2 for fifth grade. Subjects with learning or language disabilities who had been identified by the school, along with all children falling outside the designated age ranges, were eliminated from the list of potential candidates. Each participant was then randomly assigned by gender and age (grade level) to either a cued recall or free recall subgroup.

Three dependent measures were used to assess reading recall: (1) the number of explicit idea units recalled (explicit text details); (2) the number of implicit idea units recalled (inferences); and (3) the number of figurative idea units recalled (metaphors and/or analogies). Using Kintsch's (1977) concept of semantic propositions, the children's recall protocols were evaluated for meaning constructs, or idea units, according

to a modification of Turner and Greene's (1977) guidelines.

E. RESULTS

A MANOVA was performed on the three types of recall scores, Explicit (see Table 1), Implicit (see Table 2), and Figurative idea units (see Table 3), with Gender (2), Age (2) and Task (2) as the independent variables. As expected, the analysis produced significant main effects for Age and Task beyond the .01 level of significance on each of the three dependent variables but Gender failed to reach significance on any of the three dependent variables. The older age group consistently recalled more information than the younger group, and the cued recall condition consistently resulted in the retrieval of more idea units than the free condition.

One three way interaction (Age x Gender X Task) was statistically significant for Explicit recall scores (See Table 1). Of more interest and importance to this study, several two way interactions proved statistically significant. Most surprising was the statistically significant interaction between Gender and Task type. This interaction produced a consistent pattern of results that yielded effect size differences which were of considerable interest on the three dependent measures (Explicit, Implicit and Figurative idea units recalled). Boys in the cued condition scored consistently higher, (E.S. = +.28 for Explicit (see Figure 2), E.S. = +.60 for Implicit (see Figure 4) and E.S.= +.44 for Figurative recall) while girls scored

consistently higher in the free condition, (E.S. +.38 for Explicit (see Figure 2), E.S. = +.68 for Implicit (see Figure 4) and E.S. = +.20 for Figurative recall).

A second interaction occurred between Age and Task on Explicit recall scores (see Figure 1). While the move from a free to cued recall condition only produced a small effect size for the fifth grade subjects (E.S. = +.25), the change in tasks from a non-structured free condition to a structured cued condition resulted in a large effect size (E.S. = +1.3) for second graders.

The final Age by Gender interaction (see Figure 3) was limited to one dependent variable in that second grade boys scored higher than girls on the Explicit variable (E.S. = +.33) while fifth grade girls were superior to boys (E.S. = +.57).

F. DISCUSSION

Finding significant main effects for Age and Task were not surprising, and were consistent with other studies (Brown, Smiley, Day, Townsend & Lawton, 1977; Paris & Lindauer, 1976; Paris, Lindauer & Cox, 1977; Paris & Upton, 1976). Clear differences favoring the fifth graders (aged 10.2 to 11.2) over the second graders (aged 7.5 to 8.5) and favoring subjects in the cued condition over the free were both statistically significant and practically large. The failure to find a main effect due to Gender differences is of more interest given the ambiguous results of earlier work.

Clearly the lack of gender differences as a main effect is consistent with Hyde and Linn's (1988) findings. Of most interest, however, is the clear and intriguing Gender by Task interactions which makes us view Hyde and Linn's (1988) strong assertions with a note of caution. The present study found sharp differences between boys and girls depending upon the information retrieval task they were assigned. Boys' and girls' reading recall performances differed dramatically depending upon whether they were in free or cued treatment groups, with boys demonstrating superior recall in the cued condition and girls in the free condition.

One interpretation of these results could be that boys needed more structure in their recall tasks, while girls were better at imposing their own structure. Consistent with this hypothesis, Dwyer (1979) reported studies that found boys scored higher on multiple-choice tests, another externally structured recall task, while girls scored better on essay and other free-response tasks. However, the causation of these observed differences remains elusive. Do the cognitive demands of the free recall task truly highlight young females better developed verbal skills or organizational skills? Are there significant differences in the verbal skills needed to successfully complete structured objective recall tasks as opposed to unstructured essay and free recall tasks? Certainly Ellis (1972), Kintsch (1977) and Lindsay and Norman (1977) have well established that various retrieval tasks, i.e., free recall, cued recall,

recognition tasks, etc., require very different, and very specific, cognitive processes and strategies to be successfully completed.

While on the surface it would appear that Hyde and Linn's (1988) meta-analysis ruled out gender differences in verbal skills, could it be that the very nature of a meta-analysis which uses large numbers of studies that assess and define verbal ability in a variety of ways actually acted instead to cancel out any more subtle differences. For example, Dwyer (1976) found that girls appeared to perform better on reading comprehension tests, while boys scored better on reading vocabulary tests, an early indication of possible interactions of specific reading assessment tasks and gender on performance.

The Age by Task interaction on Explicit recall scores may be easier to explain. The older students, the fifth graders, only improved about one-fourth of a standard deviation when moving from the free to the cued condition as evidenced by an effect size of +.25. However, changing the tasks from one in which the children had to provide their own retrieval cues and organizational structure (free condition) to one in which the retrieval cues and structure were externally provided (cued condition) resulted in a dramatic improvement in recall performance (E.S. +1.3) for the younger children, second graders. Earlier studies by Brown, Smiley, Day, Townsend and Lawton (1977) and Paris, Lindauer and Cox (1977) also found that providing an external cue for children greatly facilitated their subsequent

recall performances. In addition, Paris and Lindauer (1976) and Brown (1975) reported a production deficiency in young children, i.e., the inability to spontaneously produce an appropriate processing strategy, but they also found the children had the ability to use a strategy efficiently that was provided for them. Based upon these studies, it could be hypothesized that the older students in the present study had developed better processing strategies for retrieval and recall than the younger students and therefore profited less from the provision of the external cues.

The final significant interaction, Age by Gender, showed that second grade boys scored higher on recalling Explicit information than did second grade girls. However, the reverse was true in fifth grade. The older girls (10.2 years to 11.2) recalled more Explicit information than the boys in the same age range. Again, their is no clear explanation for this occurrence.

F. SIGNIFICANCE OF THE STUDY

The study illustrates the importance of continued attention to gender as it interacts with reading recall in complex ways. As anticipated from Hyde and Linn (1988), the main effect for gender differences was not significant. However, an examination of interaction effects yielded distinct gender differences. Boys and girls responded in markedly different ways depending upon reading recall tasks. This finding argues for a continued exploration of the effects of cultural/social/educational variables on the cognitive processes and strategies essential to learning and

comprehending. Based on the results of the current study it seems clear that we stand a real chance of inaccurately estimating children's classroom learning. Use of tests which are not sensitive to gender or task differences could be argued to be prejudicial to either boys or girls depending upon the type of test and its content. Once these complex interactions are better understood, techniques for improving classroom learning can be appropriately implemented.

The authors do not feel that questions of attitudes, perceptions and interests can be appropriately untangled in the present study. Therefore, a follow-up study combining quantitative and qualitative research methods has been designed to address the issue of why the present results might have occurred. A qualitative open-ended interview will probe children's attitudes, perceptions, interests, and metacogntive strategy use while the quantitative components of this study are replicated. Perhaps then relationships between gender, task and information recalled as reflected by successful strategy use and task structure can be appropriately illuminated. Solutions may include the direct teaching of some comprehension strategies, paying particular attention to certain grade levels and/or gender. The complexity of the reading task hypothesized by Neisser (1967) is certainly being upheld by current research finding. As he wrote, "Reading is externally guided thinking....we may not understand it until we understand thought itself."(p. 136).

TABLE 1

A 2 (Tasks) X 2 (Age) X 2 (Gender)
Manova for Explicit Recall Scores

Source of Variation	df	Sum of Squares	F Value	p Value
TASK	1	1868.76	17.62	0.0001*
AGE	1	4038.83	38.08	0.0001*
AGE X TASK	1	824.44	7.77	0.0068*
GENDER	1	72.81	0.69	0.4101
TASK X GENDER	1	370.65	3.49	0.0657
AGE X GENDER	1	657.21	6.20	0.0151*
AGE X TASK X GENDER	1	1074.69	10.13	0.0022*

* $p < .01$

TABLE 2

A 2 (Tasks) X 2 (Age) X 2 (Gender)
Manova for Implicit Recall Scores

Source of Variation	df	Sum of Squares	F Value	p Value
TASK	1	30529.92	96.67	0.0001*
AGE	1	2511.29	7.95	0.0052*
AGE X TASK	1	10.13	0.00	0.9840
GENDER	1	48.12	0.15	0.6974
TASK X GENDER	1	2706.20	8.57	0.0046*
AGE X GENDER	1	76.09	0.24	0.6250
AGE X TASK X GENDER	1	378.02	1.20	0.2776

* $p < .01$

TABLE 3

A 2 (Tasks) X 2 (Age) X 2 (Gender)
Manova for Figurative Recall Scores

Source of Variation	df	Sum of Squares	F Value	p Value
TASK	1	8094.72	326.24	0.0001*
AGE	1	439.46	17.71	0.0001*
AGE X TASK	1	22.27	0.90	0.3466
GENDER	1	31.96	1.29	0.2602
TASK X GENDER	1	70.84	2.85	0.0954
AGE X GENDER	1	1.41	0.06	0.8124
AGE X TASK X GENDER	1	7.56	0.30	0.5826

* $p < .01$

TABLE 4

Means and Standard Deviations

Dependent Variable	N	Mean	Standard Deviation
TASK = C AGE = 2 GENDER = B			
EXPLICIT	10	41.30	5.48
IMPLICIT	10	62.00	27.15
FIGURATIVE	10	20.80	7.79
TASK = C AGE = 2 GENDER = G			
EXPLICIT	10	40.50	4.43
IMPLICIT	10	51.20	16.82
FIGURATIVE	10	18.00	6.18
TASK = C AGE = 5 GENDER = B			
EXPLICIT	10	50.70	13.20
IMPLICIT	10	75.70	25.93
FIGURATIVE	10	26.90	7.98
TASK = C AGE = 5 GENDER = G			
EXPLICIT	10	46.70	4.95
IMPLICIT	10	60.10	8.56
FIGURATIVE	10	23.40	3.72
TASK = F AGE = 2 GENDER = B			
EXPLICIT	9	28.22	13.64
IMPLICIT	9	15.67	9.57
FIGURATIVE	9	0.44	1.01
TASK = F AGE = 2 GENDER = G			
EXPLICIT	11	21.36	8.42
IMPLICIT	11	19.45	9.00
FIGURATIVE	11	0.18	0.40
TASK = F LEVEL = 5 GENDER = B			
EXPLICIT	10	35.80	8.73
IMPLICIT	10	20.50	12.48
FIGURATIVE	10	3.20	2.30
TASK = F AGE = 5 GENDER = G			
EXPLICIT	10	55.10	16.74
IMPLICIT	10	36.90	20.82
FIGURATIVE	10	4.70	3.97

FIGURE 1 Interaction Between Age and Task on Explicit Recall

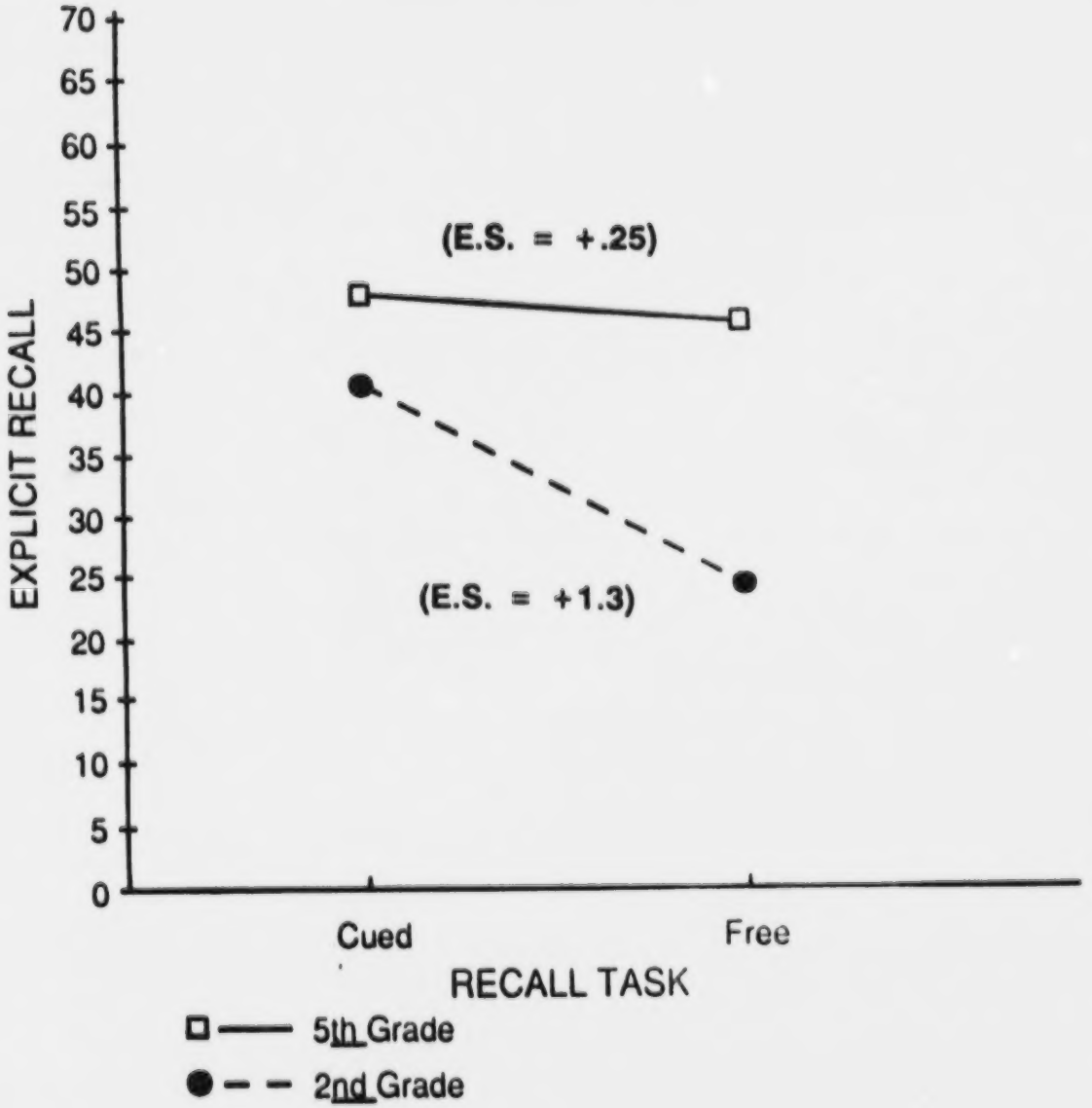


Figure 2 Interaction Between Task and Gender on Explicit Recall

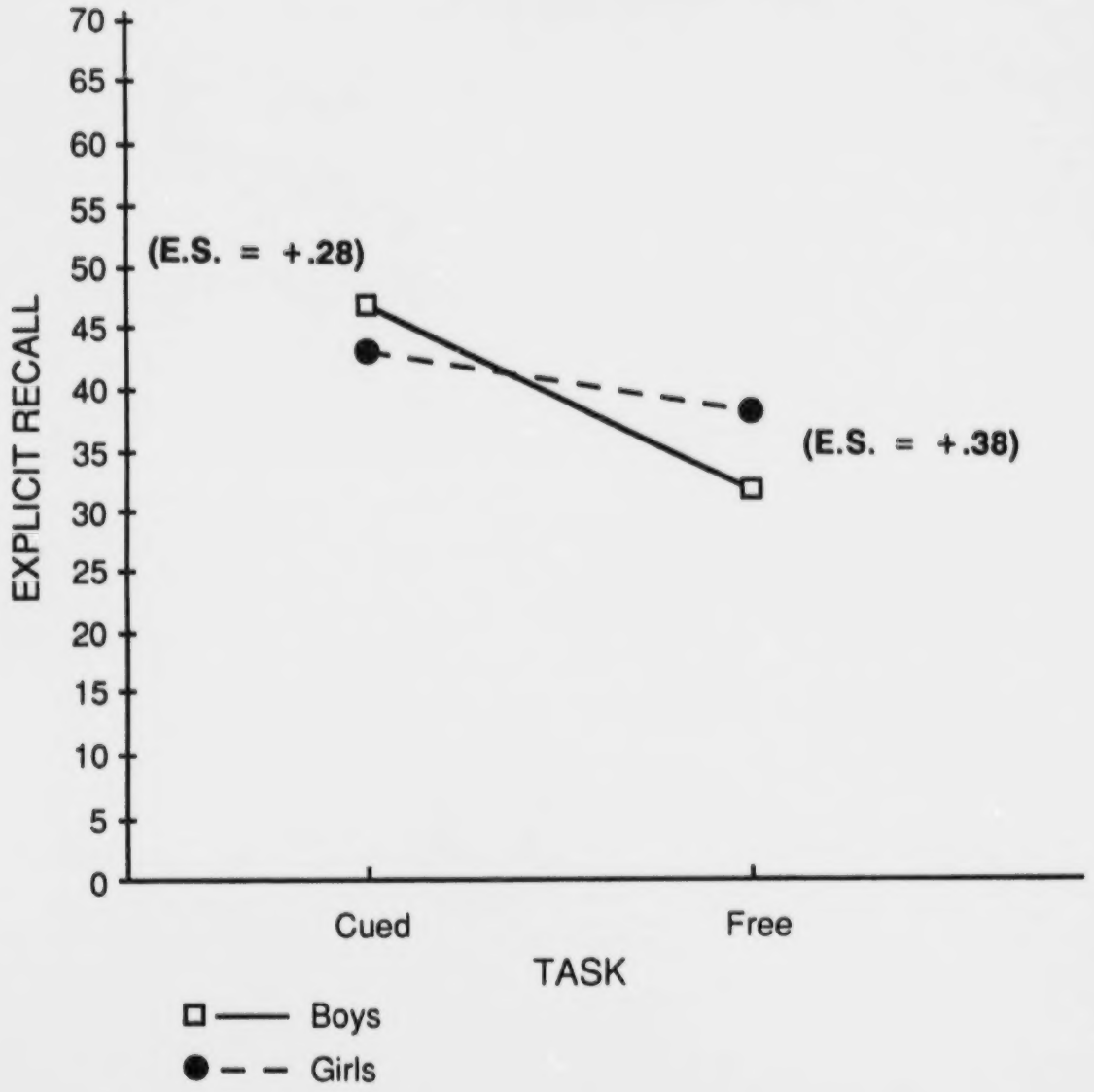


FIGURE 3 Interaction Between Age and Gender on Explicit Recall

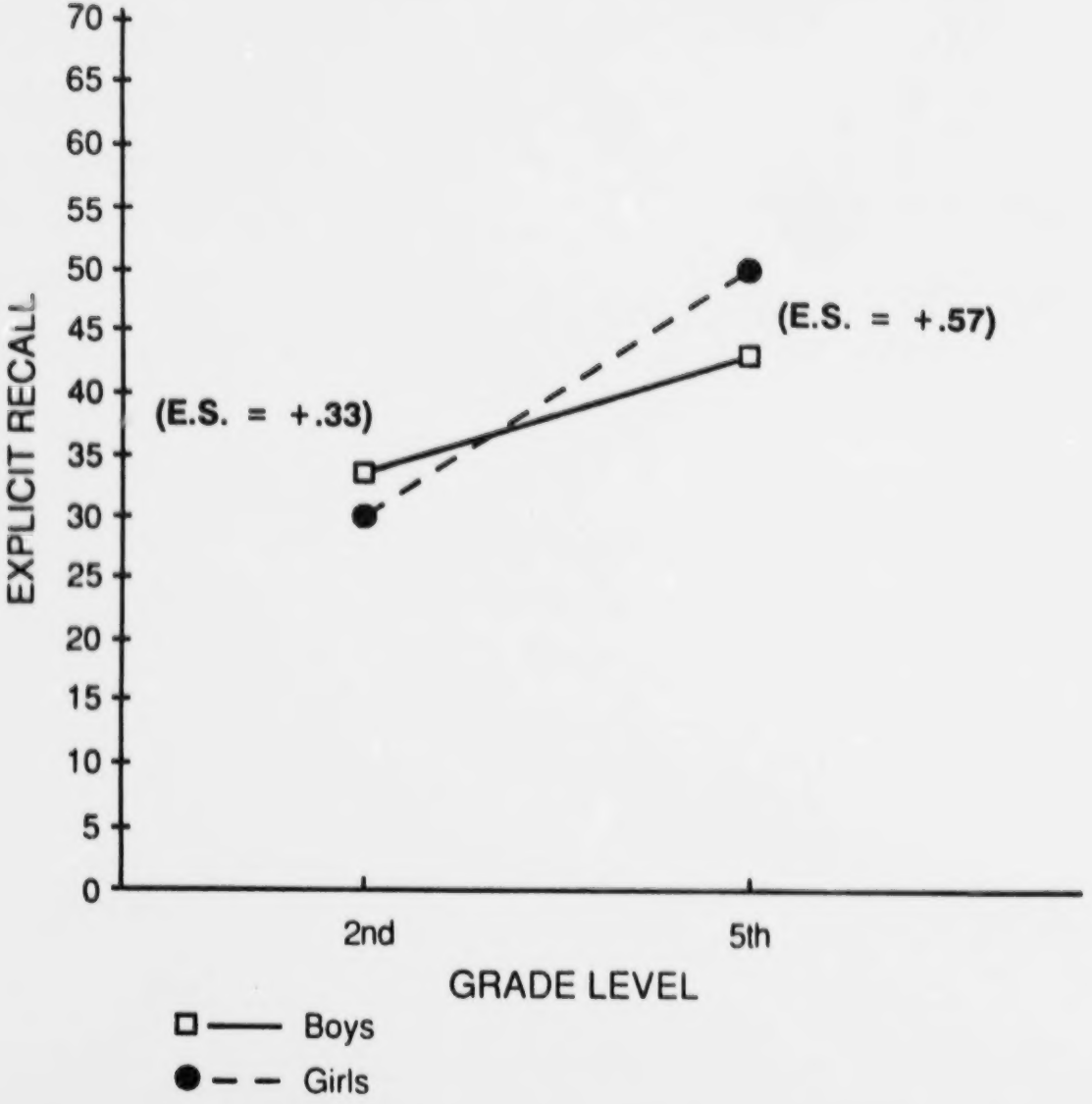
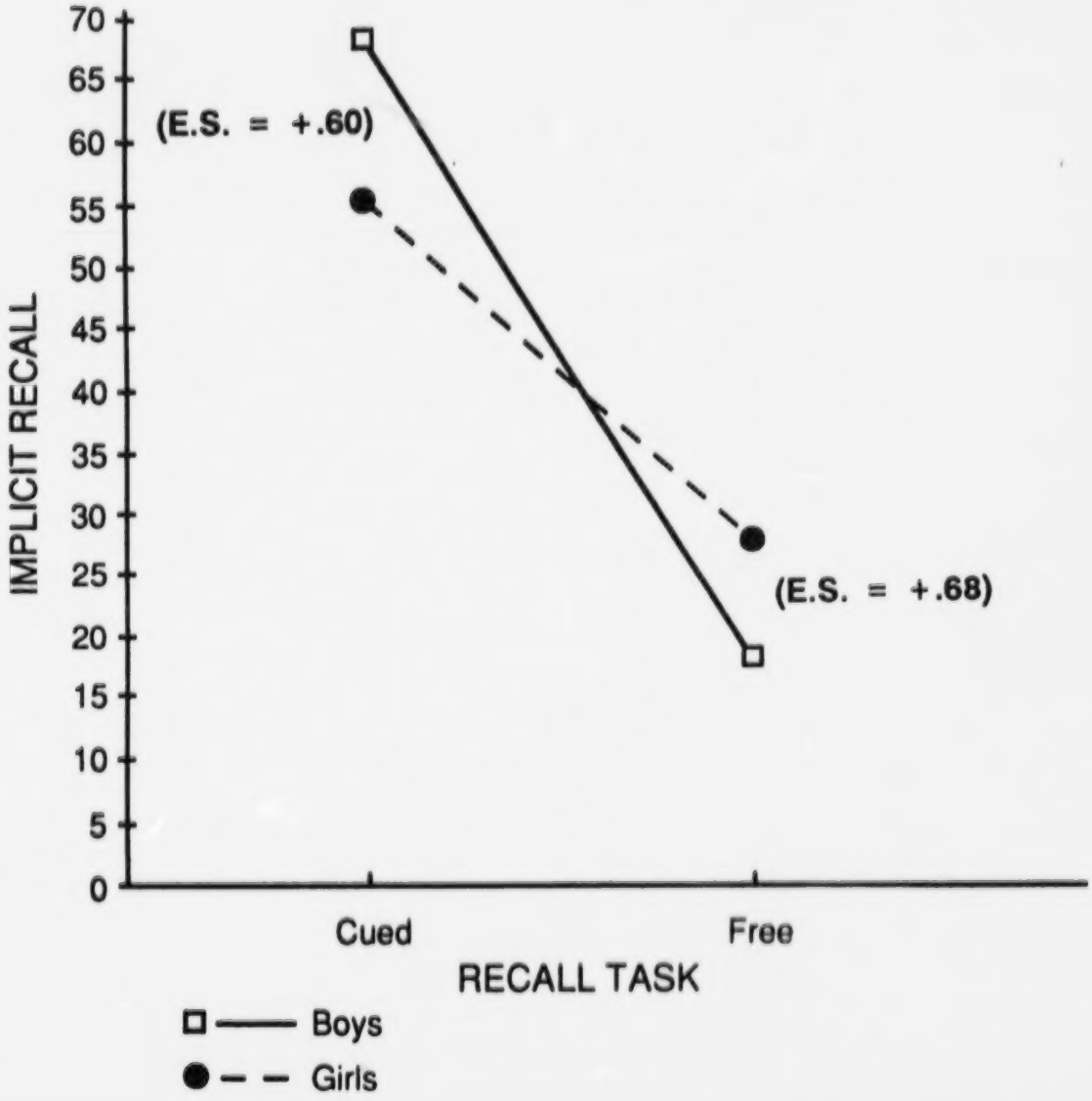


Figure 4 Interaction Between Task and Gender on Implicit Recall



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